**NASA SCIENCE MISSION DIRECTORATE**

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*Earth-Sun System Applied Sciences Program*
*Coastal Management Program Element*
*FY2006-2010 Plan*

Version: FINAL DRAFT

Date: 6/30/2006

*Expanding and accelerating the realization of economic and societal benefits from Earth-Sun System science, information, and technology*

**NASA Science Mission Directorate**
**Earth-Sun System Division**
**Applied Sciences Program**

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*Applied Sciences for the Coastal Management Program Element:*

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This document contains the Coastal Management Program Element Plan for FY 2006-2010.
This plan derives from direction established in the NASA Strategic Plan, Earth Science Enterprise and Space Science Enterprise Strategies, Earth Science Applications Plan, and OMB/OSTP guidance on research and development. The plan aligns with and serves the commitments established in the NASA Integrated Budget and Performance Document.

The Program Manager and the Applied Sciences Program Leadership have reviewed the plan and agree that the plan appropriately reflects the goals, objectives, and activities for the Program Element to serve the Applied Sciences Program, Earth-Sun System Division, NASA, the Administration, and Society.

(Signature on file) _____ _____
Lawrence Friedl Date
Program Manager, Coastal Management
Applied Sciences Program
NASA Earth-Sun System Division

(Signature on file) _____ _____
Lawrence Friedl Date
Lead, National Applications
Applied Sciences Program
NASA Earth-Sun System Division

(Signature on file) _____ _____
Ronald J. Birk Date
Director, Applied Sciences Program
NASA Earth-Sun System Division

**NASA Earth-Sun System Division: Applied Sciences Program**

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**NASA Science Mission Directorate – Applied Sciences Program**

*Coastal Management Program Element Plan: FY 2006 - 2010*

## I. Purpose and Scope

This Applied Sciences National Applications Program Element Plan is applicable for Fiscal Years 2006 through 2010. The plan documents the purpose of the program and the implementation approach to meet the program objectives using the allocated resources. The plan describes the program element approach in extending NASA Earth-Sun system science research results to meet the decision support requirements of partner agencies and organizations. The Applied Sciences Program requires this plan to function as a program management tool, describing the program structure, functional mechanisms, performance measures, and general principles that will be followed in extending NASA research results for societal benefits.

*Scope within NASA and Applied Sciences Program*

Each National Applications Program Element is managed in accordance with, and is guided by, the NASA Strategic Plan and Earth Science Applications Plan. The program element benefits from NASA Earth-Sun system science research results and capabilities, including the fleet of NASA research satellites, the predictive capability of models in the Earth System Modeling Framework (ESMF), Project Columbia, the Joint Center for Satellite Data Assimilation (JCSDA), and the Earth-Sun System Gateway (ESG). The Applied Sciences Program seeks to develop with its partners scientifically credible integrated system solutions in which uncertainty characterization and risk mitigation has been performed using the capability of the national Earth-Sun laboratories and others in the community of practice.

The FY06 President's Budget for the NASA Applied Sciences Program specifies between $48 million and $55 million annually for FY06 – FY10. There are two elements to the Applied Sciences Program: National Applications and Crosscutting Solutions. Each National Applications Program Element benefits from the performance results of Crosscutting Solutions (see Crosscutting Solutions Program Element Plan). Each National Applications Program Element leverages and extends research results from the over $2 billion per year supporting Earth-Sun system science and development of innovative aerospace science and technology. Additional information about the NASA Applied Sciences Program can be found at http://science.hq.nasa.gov/earth-sun/applications.

The Coastal Management Program Element is one of twelve elements in the Applied Sciences National Applications Program. NASA and the National Applications Program collaborate with partner organizations to enable and enhance the application of NASA's Earth-Sun system science results to serve national priority policy and management decision-support tools. The desired outcome is for partner organizations to use project results, such as prototypes and benchmark reports, to enable expanded use of Earth science products and enhance their decision-support capabilities.

The Coastal Management Program Element1 extends Earth-Sun science research results, products derived from Earth-Sun science information, models, technology, and other capabilities into partners' decision

support tools for coastal (including marine and ocean) management issues. The Coastal Management Program supports partners on issues of concern related to coastal zones, nearshore environments, marine and open-ocean activities, wetlands, estuaries, reefs, oceanic islands, and coasts of large inland waters. The program element focuses on decision tools serving the following classes of issues related to coastal, marine, and oceanic regions:

- Environmental resource management;
- Economic management and trade;
- Emergency management and response;
- Mitigation & adaptation of sea level changes; and,
- Public and environmental health.

NASA partners with Federal agencies and regional-national organizations that have coastal management responsibilities and mandates to support coastal resource managers – currently, the primary partners are the National Oceanic and Atmospheric Administration (NOAA), US Environmental Protection Agency (EPA), and the Naval Research Laboratory (NRL). The program participates with international organizations on coastal activities, usually through a US partner. Some Coastal Management activities may relate to the Water Management, Ecological Forecasting, Disaster Management, and other program elements. Through its activities, the Coastal Management program provides results for NASA support to Administration, interagency, and international activities, including the White House Committee on Environment and Natural Resources, Climate Change Science Program (CCSP), Subcommittee on Ocean Science and Resource Management Integration (SIMOR), and Integrated Global Observing Strategy (IGOS). Examples of Earth science missions for the Coastal Management Program include: Terra, Aqua, Jason, TOPEX/Poseidon, SeaWinds/QuikSCAT as well missions in planning and formulation, such as Ocean Surface Topography Mission (OSTM), Aquarius, Hydros, NPP, and NPOESS. Examples of Earth science models include NCOM, POM, SWAN, SHORECIRC, and ADCIRC. The project plans associated with the Coastal Management program element designate specific sensors and models, and they state specific activities with the partners to extend Earth science measurements, environmental data records, and geophysical parameters.
This plan covers objectives, projects, and activities for Fiscal Years 2006-2010. In Fiscal Year 2006 (FY06), the program's priority activities focus on 1) completing work on extending MODIS chlorophyll and sea surface temperature (SST) products to NOAA's Harmful Algal Bloom (HAB) Bulletin, 2) complete rapid prototype of Earth science product support to Coral Reef Early Warning System, 3) initiating competitively-selected projects related to marine mammals, fisheries management, sediments and coastal pollution, 4) supporting interagency efforts on sea level change, and 5) soliciting projects for fisheries, coastal pollution, cumulative impacts, stormwater/nutrients, sea level change and special emphasis on the Great Lakes.

In FY07-10, the program's priorities focus on 1) validating and benchmarking performance of sediments and fisheries projects begun in FY06, 2) increasing emphasis on extending coastal and ocean model products, 3) soliciting projects to begin in FY08, FY09, and FY10 on sea level change, estuaries, HAB/hypoxia, fisheries/mammals, and oil spills and coastal pollution, 4) evaluating and extending products from future sesors (e.g. NPP, OSTM, Aquarius, GPM) to support coastal decision support tools.

## II. Goals and Objectives

### Goals

The goal of the Coastal Management Program Element is to:

Enable partners' beneficial use of NASA Earth-Sun system science results, observations, models, and technology to enhance decision support capabilities serving their coastal management and policy responsibilities.

Major tenets of the Coastal Management program's goal include:

- Develop and nurture partnerships with appropriate coastal organizations
- Identify and assess partners' coastal management responsibilities, plans, and decision support tools and evaluate capacity of Earth science results to support the partners
- Validate & verify application of Earth science results with partners, including development of products and prototypes to meet partners' requirements
- With partners, document value of Earth science results relative to partners' benchmarks and support adoption into operational use
- Communicate results & partners' achievements in using Earth science results to appropriate coastal communities and stakeholders

### Objectives

All National Applications Program Elements are aligned to the NASA Strategic Plan and the agency's objectives as expressed in the NASA Integrated Budget and Performance Document (IBPD) and the Performance Assessment Rating Tool (PART).
Specifically, the Coastal Management program pursues the following short- and near-term objectives:

<u>Short-term Objectives (FY06)</u>

*QI-II 2006*

- Initiate Decisions CAN projects on marine mammals, fisheries management, coastal pollution. Initiate efforts on Gulf of Mexico sediments, fisheries, and nutrients under REASoN project (meet with partners and develop plans).
- Evaluate fisheries management decision support tools for potential Earth science product support.
- Develop Coastal Management program approach to sea level change decision support.
- Complete V&V of CREWS via rapid prototyping capability.
- Solicit projects under ROSES I for fisheries, coastal pollution, cumulative impacts, stormwater/nutrients, sea level change and special emphasis on the Great Lakes.

*QIII-IV 2006*

- Complete benchmark report on performance of MODIS, QuikSCAT, NCOM model in HAB Bulletin under REASoN.

- Initiate projects under ROSES I.
- Evaluate potential of NPP and GOES N-P products (e.g., OSSE) to serve HAB, CREWS, and other coastal decision tools.
- Support Sea Level Change activities under USGEO.
- Complete an overview of models (coastal/ocean models, land-sea interface models, wetlands, atmosphere, etc.) for potential benefit to coastal decision support tools.

Near-Term Objectives (FY07-FY10)

*2007*

- Complete validation of Earth science products for Gulf of Mexico sediments, fisheries, and nutrients under REASoN project.
- Complete reports on Decisions CAN one-year projects.
- Complete year 2 tasks of ROSES I projects.
- Depeding on ROSES I, puruse projects at fisheries/mammals and sediments or stormwater.
- Evaluate potential of OSTM (e.g., OSSE) products to serve coastal management decision tools.
- Publish at least two articles on coastal applications of Earth science, including at least one in a peer-reviewed journal.
- Support CCSP and USGEO activities related to coastal management and sea level change.

*2008*

- Complete benchmarking of Earth science products for Gulf of Mexico sediments, fisheries, and nutrients project under REASoN project.
- Complete year 3 tasks and benchmark reports of ROSES I projects.
- Solicit projects under ROSES II for sea level change, oil spills and pollution, HAB/hypoxia, and estuaries; initiate ROSES II projects.
- Evaluate potential of Aquarius to serve coastal management decision support tools.
- Publish at least 3 articles on coastal applications of Earth sciences, including one in a peer-reviewed journal.
- Support CCSP and USGEO activities related to coastal management and sea level change.

*2009*

- Complete year 2 tasks of ROSES II projects.
- Solicit projects under ROSES III for sea level change, fisheries, large mammal avoidance, sediments and stormwater management, coral coral reefs, and shipping; initiate ROSES III projects.
- Depeding on ROSES II, puruse projects at HAB/hypoxia and oil spills or estuaries.
- Evaluate application of GPM products to serve coastal management decision support tools.
- Publish at least 4 articles on coastal applications of Earth science, including at least two in a peer-reviewed journal.
- Support CCSP and USGEO activities related to coastal management and sea level change.

*2010*

- Complete year 3 tasks and benchmark reports of ROSES II projects.
- Complete year 2 tasks of ROSES III projects.
- Solicit projects under ROSES IV for sea level change, oil spills and pollution, HAB/hypoxia, and estuaries;

initiate ROSES IV projects.
- Depending on ROSES III, puruse projects at sea level change or estuaries and fisheries or pollution.
- Evaluate application of NPOESS products to serve priority coastal decision support tools.
- Support CCSP and USGEO activities related to coastal management and sea level change.

Note: The objectives are cumulative totals for the program rather than specific to an individual year.

## III. Program Management and Partners

### A. Program Management

Coastal Program Manager:
Lawrence Friedl,
NASA-Headquarters

- Program development, strategy, plans and budgets
- Program representation and advocacy; report results and issues to ESE management & beyond
- Manage program to meet IBPD objectives and serve program assessments (e.g., PART)
- Communication of ESE priorities and directives to Coastal program team and network
- Implementation of interagency agreements and partnerships
- Represent program and ESE through interagency/international committees and working groups
- Monitor Coastal Management program measures and performance evaluation

Coastal Deputy Program Manager:
Callie Hall, NASA-Stennis

- Leadership on project plans, development, performance, and partnership relationships
- Communication of project measures, performance, status, and issues to Program Manager
- Leadership and communication to Coastal program team and network
- Coordination between NASA Centers on Coastal Management program activities
- Management of grants & cooperative agreements funded through Stennis
- Management of Coastal Management program tasks at Stennis Space Center

### B. Coastal Management Network & Partners

<u>Applied Sciences & NASA Centers:</u>

Water & Energy Cycle Theme ..... Jared Entin, NASA HQ
Carbon Cycle and Ecosystems Theme..... Diane Wickland, NASA HQ
Climate Variability and Change Theme..... Don Anderson, NASA HQ
Ocean Biogeochemistry ..... Paula Bontempi, NASA HQ
Physical Oceanography..... Eric Lindstrom, NASA HQ
Business & Budget ..... Joan Haas, NASA HQ
Stennis Space Center (SSC)..... Callie Hall
Jet Propulsion Laboratory (JPL)..... Tony Freeman
Goddard Space Flight Center (GSFC) ..... Peter Hildebrand / Gene Feldman

GSFC-Wallops Flight Facility (WFF)..... John Gerlach
Ames Research Center (ARC).....Liane Guild

Federal Partners:

NOAA ..... Steve Raber (CSC)
Chris Brown (NESDIS)
- National Ocean Service (NOS)
- National Marine Fisheries Service (NMFS)
- National Environmental Satellite, Data and Information Service (NESDIS)
- NESDIS National Coastal Data & Distribution Center (NCDDC)
- NOS Coastal Services Center (CSC)

US EPA..... Diane Rigas, Bryon Griffith
- Office of Water (OW)
- Office of International Activities (OIA)
- Office of Environmental Information (OEI)
- Office of Research and Development (ORD)
- Gulf of Mexico Program Office (GMPO)

NRL..... Bob Arnone

The U.S. Ocean Action Plan directs the Executive branch agencies to support regional collaborations on oceans, coasts, and Great Lakes policy in partnership with leadership of states, localities, and tribes. Entering FY06, the program is directly involved with two regional efforts -- the Great Lakes Interagency Task Force (created from a 2004 Executive Order; (http://epa.gov/greatlakes/collaboration/taskforce/) and the Gulf of Mexico Alliance (www.gulfofmexicoalliance.org). The program expects other regionally-oriented efforts to develop and will support those efforts also, as appropriate.

International, National & Regional Organizations:

Oceans.US
IGOS: Integrated Global Observing Strategy (Coastal Theme)
Coral Reef Taskforce
Ecology and Oceanography of Harmful Algal Blooms (ECOHAB)
Ocean Conservancy
Coastal States Organization

Distributed Active Archive Centers (DAAC) & Earth Science Modeling Centers:
Physical Oceanography DAAC (PO DAAC - JPL)
Global Hydrology Resource Center (GHRC - MSFC)
GSFC Earth Science DAAC (GES DAAC - GSFC)
Land Processes DAAC (LP DAAC - USGS)
Laboratory for Hydrospheric Processes (GSFC)

## IV. Decision Support Tools and Management Issues

### Priority Decision Support Tools

#### Harmful Algal Bloom (HAB) Forecast & HAB Mapping System

NOAA operates the HAB Forecast system to identify, track, and monitor the status of harmful algal blooms in the northern and eastern Gulf of Mexico, and NOAA operates the HAB Mapping System to give coastal managers and the public access to data and information on HAB conditions. NOAA sends notices via e-mail to coastal resource managers on HAB events. Earth science products, such as chlorophyll and winds, provide insight into location and transport of HABs. The Coastal Management application works with NOAA and NRL on use of MODIS products, QuikSCAT winds, other products, and data fusion techniques to assist the HAB reporting. (www.csc.noaa.gov/crs/habf/index.html).

#### Coral Reef Early Warning System (CREWS) & ReefBase

NOAA operates CREWS and produces automated electronic mail and Internet-based alerts when conditions are expected to be conducive or predictive of coral bleaching. CREWS uses Earth science data such as wind speed, sea surface temperature, and primary productivity to assess potential bleaching conditions. Similarly, ReefBase provides information and mechanisms to serve international coral reef policy and management activities. CREWS: (www.coral.noaa.gov/crews/index.shtml)

#### Regional Sediment Management System

The U.S. Army Corps of Engineers (USACE) manages sediment on a regional basis so that water resources projects are economically feasible and environmentally sustainable. Regional sediment management seeks to minimize disruption of natural sediment pathways and to reconcile natural processes that adversely affect the performance or regional impacts of USACE projects. Regional sediment management decision support tools use hydrodynamic and meteorological data on coastal waves, water levels, currents, winds, and storms, historic bathymetric data, topographic data, and shoreline. (www.wes.army.mil/rsm/)

**Potential Coastal Management Management Issues: FY06-FY10**

On an on-going basis, the program consults with partners to identify important issues facing the coastal community, examines associated decision support tools, and determines priorities within the Coastal Management program portfolio. Topics include:

• Sediment transport
• Coastal Pollution Wetlands & estuary management
• Sea-level change & Coastal inundation
• Hypoxia and eutrophication
• Stormwater Runoff
• Sea level change
• Coral Reefs
• Harmful Algal Blooms
• Marine mammal avoidance
• Fishery management (including marine fisheries, aquaculture, etc.)

**Cross-Application Activities**

The program consists of functional elements that contribute to all of the National Applications activities. The intention is to have the performance of these functions leverage accomplishments, and therefore the apparent resource investment, to the greatest extent possible into the National Applications partnerships. These functions are: Geoscience Standards and Interoperability, Human Capital Development, Integrated Benchmark Systems, and Solutions Networks. Examples of leveraged activities are:

- The Earth-Sun System Gateway is a "portal of portals" providing an access point through an Internet interface to all web-enabled NASA research results.
- A Solutions Networks capability to discover candidate configurations of NASA research results with the potential to improve partner's decision support systems.
- A Rapid Prototyping Capability to support NASA and partners in reducing uncertainty and testing the validity of NASA research results in decision support tools.
- Systems integration capability, knowledge tools and skilled human capital to help conduct studies on the systematic transitioning of the results of research to operational uses and the capability of operational systems to support scientific research.
- A student-based, human capital development program for building capability in entry level participants in the community of practice while developing solutions for state and local applications.

## V. Application Activities

### A. Projects

All National Applications Program Elements authorize peer-reviewed projects to support each element's goal and objectives. To secure funding and authorization to undertake activities supporting NASA and the Applied Sciences Program, project teams are responsible for developing project plans and managing the activities. The project plans specify the Earth-Sun observations, models, and other research results to extend to decision support tools as well as the activities to produce appropriate deliverables. The plans integrate contributions from appropriate the partners, NASA Centers and other contributors from the community of practice. Projects are expected to extend the benefits of NASA research results to the maximum extent possible, including the use observations from sensors on: Aura, Terra, Aqua, TRMM, NPP, NPOESS, Hydros, Topex, Jason, OCO and Aquarius.

### B. Solicitations

The Applied Sciences Program utilizes full and open competitions to fund proposals from the community to contribute the Agency's objectives. This implementation strategy will continue to be critical part of extending the benefits of NASA Earth-Sun system research results and contributing to the improvement of future operational systems. The Program has participated in providing opportunities to the community in recent solicitations, including REASoN, Decisions 2004, and Decisions under ROSES. The proposals related to this National Applications Program Element that have been funded under these solicitations are described in Section V.D. Program Element Projects.

### C. Congressionally Directed Activities

As of the publication of this document, an assignment of FY06 congressionally mandated activities was not completed by the Agency.

The procurement rules and management practices of the Agency require that congressionally mandated activities follow the same principles of planning and accountability as all other funded projects. Only activities that are aligned with NASA's mission, are technically credible, and are appropriately budgeted will be approved to receive funding from the Program. The project teams of congressionally mandated activities are responsible for developing project plans and managing the activities.

### D. Program Element Projects

Included below are the brief descriptions of the funded projects managed under this National Applications Program Element. Complete and detailed descriptions are documented in the Project Plans for each activity.

**Project:** Harmful Algal Blooms — Directed Project

The purpose is to validate and benchmark the performance of Earth science products, especially satellite products and coastal-ocean models, for beneficial & routine use in NOAA HAB decision support tools. This project works in coordination with the REASoN-funded project. Priority DSS: HAB Bulletin, HAB Mapping System. Budget reflects funds to support NASA's activities in cooperative agreement with NRL, ACT, NOAA. FY06-08: Transition techniques to NOAA for operational support; expand to other Coastal application topics and product lines (hypoxia, sediment transport)

*Budget ($K)*

*Procurement*

| | |
|---|---|
| FY06 | 75 |
| FY07 | 75 |
| FY08 | 0 |
| FY09 | 0 |
| FY10 | 0 |

| *Project Manager* | *Centers* | *Timeframe* | *Partners* |
|---|---|---|---|
| Callie Hall | SSC (lead), GSFC | FY04 - FY07 | NOAA, NRL, EPA |

*Earth Science Products*

Terra-MODIS, Aqua-MODIS, QuikSCAT, Jason, NCOM, ADCIRC, SWAN, SHORECIRC

*Other Apps.*

*Deliverables*

| *Description* | *End Date* | *IBPD Metric #* |
|---|---|---|
| Evaluation Report | complete | |
| Design & Implement | 6/30/2005 | |
| Verification and Validation Report | 6/30/2005 | |
| Benchmark Report | 9/30/2005 | 6ASP05.A |
| Project Plan | 10/1/2005 | |
| Results Conference | 9/30/2006 | |
| Cooperative Agreement | 9/30/2006 | |

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*Notes:*

**Project:** RPC: Coral Reefs/ReefBase — Directed Project

The purpose of this project is to rapidly assess (aka, prototype) Earth science products that might support the enhancement and routine use in coral reef management and related international activities. The priority DSSs are the CREWS and ReefBase. The objective for 2006 is to determine a proposed, prototypical arrangement for the use of Earth science products (particularly non-imagery-based solutions) in CREWS. The project must be done in coordination with the user organizations and at least 2 NASA Centers. The final product/report should be 20pages or less (including appendices), with discussion of "process" limited to 2pages or less. Monthly status reports are required. Activities carried out through Solutions Network and RPC.

| *Budget ($K)* | *Procurement* |
|---|---|
| FY06 | 0 |
| FY07 | 0 |
| FY08 | 0 |
| FY09 | 0 |
| FY10 | 0 |

| *Project Manager* | *Centers* | *Timeframe* | *Partners* |
|---|---|---|---|
| Callie Hall | SSC, GSFC, others | FY04 - FY06 | NOAA, EPA, NGOs |

*Earth Science Products*: Terra, Aqua, QuikSCAT, Topex/Poseidon, Jason. Discussion should address potential benefits/impacts of NPP sensors and should anticipate improvement from OSTM

*Other Apps.*: Ecological Forecasting

*Deliverables*

| *Description* | *End Date* | *IBPD Metric #* |
|---|---|---|
| Evaluation Report | | |
| Design & Implement | | |
| Verification and Validation Report | | |
| Benchmark Report | | |
| Project Plan | 11/15/2005 | |
| Assess & Prototype Development | 2/16/2006 | |
| Final report (draft) | 4/1/2006 | |
| Final report (w/ partner comments) | 5/1/2006 | |

*Notes:* Activities performed through Rapid Prototyping Center. Follow-on activities determined by results from RPC efforts.

**Project:** REASoN-Coastal Decision Support — Solicitation

The purpose of this activity is to support extension of Earth science products to Coastal Management decision support activities in the Gulf of Mexico. Project includes activities to modify algorithms, utilize data-fusion techniques, produce routine products, and enable use of coastal-ocean model products to support the coastal resource management community. FY04-FY06: Focus on HABs and NOAA HAB Bulletin and Forecasting System. Benchmark report (including transition to NOAA) due by end of FY06 on HAB activity; production of products can continue through end of cooperative agreement. FY06-08: Initiate and focus on Gulf sediment transport, nutrients/hypoxia, and fisheries/shellfish decision support activities.

*Budget ($K)*

*Procurement*

| | |
|---|---|
| FY06 | 370 |
| FY07 | 200 |
| FY08 | 100 |
| FY09 | 0 |
| FY10 | 0 |

| *Project Manager* | *Centers* | *Timeframe* | *Partners* |
|---|---|---|---|
| Terry McPherson | SSC | FY03 - FY08 | NRL, NOAA, USACE, others |

| | |
|---|---|
| *Earth Science Products* | Terra, Aqua, QuikSCAT, Topex/Poseidon, Jason, NPP, others; Coastal-ocean models - NCOM, ADCIRC |
| *Other Apps.* | |

*Deliverables*

| *Description* | *End Date* | *IBPD Metric #* |
|---|---|---|
| Evaluation Report | | |
| Design & Implement | | |
| Verification and Validation Report | | |
| Benchmark Report | 9/1/2008 | |
| Semi-annual report | 3/31/2006 | |
| Semi-annual report | 9/30/2006 | |
| Project Plan-FY06 HAB | 3/1/2006 | |
| Benchmark Report-HABs | 9/1/2006 | |
| Results Conference-HABs | 9/1/2006 | |
| FY06-08 Transition Approach | 3/1/2006 | |

*Notes:* Coastal program plans to provide funds to supplement REASoN funding and maintain activities at/near $600-800K over the course of the project. Continued funding is based on good project evaluations, favorable results, and available funding.

**Project:** ORHAB: Supplement to ECOHAB — Solicitation

The purpose of this activity is to examine the ability of satellite-based measurements to observe physical oceanographic features that may contribute to the development, identification, and tracking of Harmful Algal Blooms in the Pacific Northwest. The Olympic Region Harmful Algal Blooms (ORHAB) partnership aims to mitigate HAB effects by providing improved tools for protecting public health, building consumer confidence in fishery products, and enhancing revenues for coastal communities. This activity is a cost-share between Research & Applied Sciences (combined $120K per year for 3 years).

*Budget ($K)*

*Procurement*

| | |
|---|---|
| FY06 | 30 |
| FY07 | 0 |
| FY08 | 0 |
| FY09 | 0 |
| FY10 | 0 |

| *Project Manager* | *Centers* | *Timeframe* | *Partners* |
|---|---|---|---|
| Eric Lindstrom | HQ | FY04 - FY06 | NOAA, EPA, Wash. St. |

*Earth Science Products*: QuikSCAT, AMSR, MODIS, AVHRR, Topex/Poseidon, SeaWiFS, QUODDY, POM, ELCIRC

*Other Apps.*

*Deliverables*

| *Description* | *End Date* | *IBPD Metric #* |
|---|---|---|
| Evaluation Report | | |
| Design & Implement | | |
| Verification and Validation Report | | |
| Benchmark Report | | |
| Final Report | 9/1/2006 | |
| Annual Status Report | 12/31/2006 | |

*Notes:*

| **Project:** Program Management: Working Groups, Committees, Conferences | | | | Project Management | |
|---|---|---|---|---|---|
| Support interagency, national, regional, and international working groups. Develop joint development pans and white papers. Prepare journal articles. Sponsor workshops/conferences and support conference booths. | | | | *Budget ($K)* *Procurement* | |
| | | | | FY06 | 50 |
| *Project Manager* | *Centers* | *Timeframe* | *Partners* | FY07 | 50 |
| Lawrence Friedl | ARC, GSFC, JPL, MSFC, SSC | Annual - | | FY08 | 50 |
| | | | | FY09 | 50 |
| | | | | FY10 | 50 |
| *Earth Science Products* | | | | *Other Apps.* | |
| *Deliverables* | *Description* | *End Date* | *IBPD Metric #* | | |
| | Evaluation Report | | | | |
| | Design & Implement | | | | |
| | Verification and Validation Report | | | | |
| | Benchmark Report | | | | |
| | Coastal GeoTools | 12/31/2007 | | | |
| | Coastal Zone | 12/31/2007 | | | |
| *Notes:* | | | | | |

**Project:** Model and Observation Potentials — Directed Project

Focus is on reviews of models and future Earth science observations to serve coastal management decision making. FY06: Succint, thorough review of coastal-ocean models and potential for the Coastal Management application activitiese. FY06-10: Succint, thorough assessments of upcoming Earth observation sensors (planned/formulation; NPP, OSTM, Aquarius, GPM, NPOESS) relating to Coastal Management applicaiton activities and potential benefits.

*Budget ($K)*

*Procurement*

| | |
|---|---|
| FY06 | 50 |
| FY07 | 50 |
| FY08 | 50 |
| FY09 | 50 |
| FY10 | 50 |

| *Project Manager* | *Centers* | *Timeframe* | *Partners* |
|---|---|---|---|
| Lawrence Friedl | SSC, GSFC, JPL, others | FY06 - FY10 | |

*Earth Science Products*

Planned and in formulation sensors/platforms: NPP, GOES N-P, OSTM, Aquarius, GPM, NPOESS. Numerous models.

*Other Apps.*

*Deliverables*

| *Description* | *End Date* | *IBPD Metric #* |
|---|---|---|
| Evaluation Report | | |
| Design & Implement | | |
| Verification and Validation Report | | |
| Benchmark Report | | |
| NPOESS assessment | 3/1/2010 | |
| NPP, GOES N-P assessment | 3/1/2006 | |
| OSTM (form.) assessment | 3/1/2007 | |
| Aquarius (form.) assessment | 3/1/2008 | |
| GPM (form.) assessment | 3/1/2009 | |

*Notes:* Activities and assessment performed by Solutions Netowrk, contract support, or NASA Center personnel, as needed.

**Project:** Decisions - Augmentation: Marine Mammal Avoidance — Solicitation

Project focuses on use of Earth science observations and models to support dynamic area management (DAM) zones for closure when conditions conducive for presence of right whales exist. NOAA Marine Fisheries Services is responsible for right whale species management. Project is one-year's effort to develop a prototype combination of observations and model products to assess feasibility and potential value.

*Budget ($K)*

*Procurement*

| | |
|---|---|
| FY06 | 165 |
| FY07 | 0 |
| FY08 | 0 |
| FY09 | 0 |
| FY10 | 0 |

| *Project Manager* | *Centers* | *Timeframe* | *Partners* |
|---|---|---|---|
| Andrew Pershing | | FY06 - FY06 | NOAA, Univ. |

*Earth Science Products*: SST (MODIS), Wind (QuikSCAT), Chlorophyll (SeaWiFS, MODIS), MM5-fvCOM, MM5, SSH (Jason)

*Other Apps.*: Eco Forecasting

*Deliverables*

| *Description* | *End Date* | *IBPD Metric #* |
|---|---|---|
| Evaluation Report | | |
| Design & Implement | | |
| Verification and Validation Report | | |
| Benchmark Report | | |
| Project Plan | 11/1/2005 | |
| Prototype Demonstration | 9/1/2006 | |
| Prototype Report | 9/30/2006 | |

*Notes:* Shared with Ecological Forecasting ($165K also)

**Project:** Decisions - Augmentation: Fisheries/Oil Spills — Solicitation

Project focuses on use of Earth science observations and models to support fisheries/aquaculture management and oil spill response in Alaska. Project will develop a prototype for use of Earth science results and quantitative improvement of the decision support tools.

*Budget ($K)*

*Procurement*

| | |
|---|---|
| FY06 | 270 |
| FY07 | 0 |
| FY08 | 0 |
| FY09 | 0 |
| FY10 | 0 |

| *Project Manager* | *Centers* | *Timeframe* | *Partners* |
|---|---|---|---|
| Stephen Okkonen | JPL | FY06 - FY06 | NOAA, Univ. |

*Earth Science Products*

SST (Aqu, AVHRR), SSH (Jason, TOPEX), Winds (QuikSCAT), Color (SeaWiFS, Aqua), meteorology, local observing systems. Models: ROMS, RAMS, SWAN.

*Other Apps.*

*Deliverables*

| *Description* | *End Date* | *IBPD Metric #* |
|---|---|---|
| Evaluation Report | | |
| Design & Implement | | |
| Verification and Validation Report | | |
| Benchmark Report | 9/30/2006 | |
| Project Plan | 11/1/2005 | |
| Demonstration | 8/1/2006 | |
| Final Report | 9/30/2006 | |

*Notes:*

**Project:** Decisions - Augmentation: Gulf of Mexico Oil Exploration — Solicitation

Project focuses on use of Earth science observations and models to support detection of gas flaring and venting related to oil exploration. The DOI Minerals and Management Services monitors and regulates gas flaring and venting. Project is one-year's effort to develop a prototype combination of observations and model products to assess feasibility and potential value.

*Budget ($K)*

*Procurement*

| | |
|---|---|
| FY06 | 150 |
| FY07 | 0 |
| FY08 | 0 |
| FY09 | 0 |
| FY10 | 0 |

| *Project Manager* | *Centers* | *Timeframe* | *Partners* |
|---|---|---|---|
| Sonia Gallegos | SSC | FY06 - FY06 | NRL, DOI-MMS |

*Earth Science Products*: MODIS - aerosol optical depth

*Other Apps.*: Energy Man.

*Deliverables*

| *Description* | *End Date* | *IBPD Metric #* |
|---|---|---|
| Evaluation Report | | |
| Design & Implement | | |
| Verification and Validation Report | | |
| Benchmark Report | | |
| Project plan | 11/1/2005 | |
| Prototype demonstration | 8/1/2006 | |
| Prototype report | 9/30/2006 | |

*Notes:* Shared with Energy Management ($150K also)

**Project:** Project Solicitations: ROSES I-IV — Solicitation

Coastal Management Program will participate in Science Mission Directorate solicitations (Research Opportunities in Space and Earth Sciences - ROSES). Projects are 3-year efforts. Solicitaitons and corresponding priorities include: ROSES I (2006): fisheries, coastal pollution, cumulative impacts, stormwater/nutrients, sea level change and special emphasis on the Great Lakes; ROSES II (2008): sea level change, oil spills and pollution, HAB/hypoxia, estuaries ROSES III (2009): sea level change, fisheries/mammals, sediments, stormwater, corals, shipping ROSES IV (2010): sea level change, oil spills and pollution, HAB/hypoxica, estuaries

*Budget ($K)*

*Procurement*

| | |
|---|---|
| FY06 | 417 |
| FY07 | 417 |
| FY08 | 917 |
| FY09 | 1000 |
| FY10 | 1500 |

| *Project Manager* | *Centers* | *Timeframe* | *Partners* |
|---|---|---|---|
| Lawrence Friedl | HQ | FY06 - FY12 | mult. |

*Earth Science Products*

Strong emphasis on models and use of upcoming NASA sensors and platforms

*Other Apps.*

*Deliverables*

| *Description* | *End Date* | *IBPD Metric #* |
|---|---|---|
| Evaluation Report | | |
| Design & Implement | | |
| Verification and Validation Report | | |
| Benchmark Report | | |
| ROSES I Projects (2006-2008) | 9/30/2008 | |
| ROSES II Projects (2008-2010) | 9/30/2010 | |
| ROSES III Projects (2009-2011) | 9/30/2011 | |
| ROSES IV Projects (2010-2012) | 9/30/2012 | |

*Notes:* *** Total National Apps. funds (planned) *** ROSES I: 15M (over 3 years) - Coastal approx. 1.25M ROSES II: 18M (over 3 years) - Coastal approx. 1.5M ROSES III: 18M (over 3 years) - Coastal approx. 1.5M ROSES IV: 18M (over 3 years) - Coastal approx. 1.5M

**Project:** REASoN - Coastal Decision Support (Supplement) — Solicitation

The purpose of this activity is to support extension of Earth science products to Coastal Management decision support activities in the Gulf of Mexico. Project includes activities to modify algorithms, utilize data-fusion techniques, produce routine products, and enable use of coastal-ocean model products to support the coastal resource management community. FY04-FY06: Focus on HABs and NOAA HAB Bulletin and Forecasting System. Benchmark report (including transition to NOAA) due by end of FY06 on HAB activity; production of products can continue through end of cooperative agreement. FY06-08: Initiate and focus on Gulf sediment transport, nutrients/hypoxia, and fisheries/shellfish decision support activities.

| *Budget ($K)* | *Procurement* |
|---|---|
| FY06 | 300 |
| FY07 | 230 |
| FY08 | 300 |
| FY09 | 0 |
| FY10 | 0 |

| *Project Manager* | *Centers* | *Timeframe* | *Partners* |
|---|---|---|---|
| Callie Hall | SSC | FY03 - FY08 | NRL, NOAA |

| *Earth Science Products* | *Other Apps.* |
|---|---|
| Terra, Aqua, QuikSCAT, Topex/Poseidon, Jason, NPP, others; Coastal-ocean models - NCOM, ADCIRC | |

*Deliverables*

| *Description* | *End Date* | *IBPD Metric #* |
|---|---|---|
| Evaluation Report | | |
| Design & Implement | | |
| Verification and Validation Report | | |
| Benchmark Report | 9/1/2006 | |
| Semi-annual reports | 4/1/2006 | |
| Benchmark report | 9/1/2008 | |
| Project Plan-FY06 HAB | 11/15/2005 | |
| Results Conference-HABs | 9/1/2006 | |
| FY06-08 Transition Approach | 11/15/2005 | |

*Notes:* This represents the supplemental funding to the project to maintain activities at/near $600-800K over the course of the project. Continued funding is based on good project evaluations, favorable results, and available funding.

**Project:** Coastal Water Quality - Chesapeake Bay

This project focuses on the application of MODIS and other Earth science products related to the Chesapeake Bay and coastal water quality. This project is largely designed as a proof-of-concept for proposed techniques, and, if successful, the techniques may help with assessing the health status of coastal waterways. For the one-year effort, the project focuses on supporting the Chesapeake Bay DSS using Chl a Kd, TSS, and DO, test the teams proposed techniques, and develop a prototype to determine the potential value.

*Budget ($K)*

*Procurement*

| | |
|---|---|
| FY06 | 175 |
| FY07 | 0 |
| FY08 | 0 |
| FY09 | 0 |
| FY10 | 0 |

| *Project Manager* | *Centers* | *Timeframe* | *Partners* |
|---|---|---|---|
| | GSFC | FY06 - FY06 | ChesBay Prog Office, EPA |

| *Earth Science Products* | MODIS, ASTER | *Other Apps.* |
|---|---|---|

*Deliverables*

| *Description* | *End Date* | *IBPD Metric #* |
|---|---|---|
| Evaluation Report | | |
| Design & Implement | | |
| Verification and Validation Report | | |
| Benchmark Report | | |
| Project Plan | 11/15/2005 | |
| Prototype Demonstration | 9/1/2006 | |
| Prototype Report | 9/1/2006 | |

*Notes:*

**Project:** Marine Fisheries & Mammals — Directed Project

This project focuses on the use of NASA Earth science research results to support activities in marine fisheries and/or marine mammal avoidance. Both of these issues are of significant economic importance to regional and national interests. The Coastal Management program will solicit projects related to these issues in the ROSES I solicitation (FY06). However, if no projects are selected, the program plans to pursue a directed activity due to the signficant impact of these issues.

*Budget ($K)*

*Procurement*

| | |
|---|---|
| FY06 | 0 |
| FY07 | 150 |
| FY08 | 150 |
| FY09 | 0 |
| FY10 | 0 |

| *Project Manager* | *Centers* | *Timeframe* | *Partners* |
|---|---|---|---|
| | GSFC, SSC, JPL | FY07 - FY08 | NOAA |

*Earth Science Products*: Models (fvCOM, others), Geophysical parameters (SST, SSH, Winds, Chl a, others)

*Other Apps.*

*Deliverables*

| *Description* | *End Date* | *IBPD Metric #* |
|---|---|---|
| Evaluation Report | | |
| Design & Implement | | |
| Verification and Validation Report | 9/1/2007 | |
| Benchmark Report | 9/1/2008 | |
| Project Plan | 11/1/2006 | |
| Demonstration | 6/1/2008 | |

*Notes:* This activity is coordinated with Ecological Forecasting.

**Project:** Sediments / Stormwater Management — Directed Project

This project focuses on the use of NASA Earth science research results to support activities in sediment management and/or stormwater management. Both of these issues are of significant economic importance to regional and national interests. The Coastal Management program will solicit projects related to these issues in the ROSES I solicitation (FY06). However, if no projects are selected, the program plans to pursue a directed activity due to the signficant impact of these issues.

*Budget ($K)*

*Procurement*

| | |
|---|---|
| FY06 | 0 |
| FY07 | 150 |
| FY08 | 150 |
| FY09 | 0 |
| FY10 | 0 |

| *Project Manager* | *Centers* | *Timeframe* | *Partners* |
|---|---|---|---|
| | SSC, GSFC, JPL | FY07 - FY08 | ACE, EPA, others |

*Earth Science Products*

Coastal ocean models, sediment models, and geophysical parameters - specifics determined in course of project and thorugh Solutions Network and RPC activities.

*Other Apps.*

*Deliverables*

| *Description* | *End Date* | *IBPD Metric #* |
|---|---|---|
| Evaluation Report | | |
| Design & Implement | | |
| Verification and Validation Report | 9/1/2007 | |
| Benchmark Report | 9/1/2008 | |
| Project Plan | 11/1/2006 | |
| Demonstration | 6/1/2008 | |

*Notes:*

**Project:** Sea Level Change / Estuaries — Directed Project

This project focuses on the use of NASA Earth science research results to support activities in sea level change and/or estuaries management. Both of these issues are of significant importance to regional and national interests. The Coastal Management program will solicit projects related to these issues in the ROSES I-IV solicitations. However, if no projects are selected, the program plans to pursue a directed activity due to the signficant impact of these issues.

*Budget ($K)*

*Procurement*

| | |
|---|---|
| FY06 | 0 |
| FY07 | 0 |
| FY08 | 0 |
| FY09 | 150 |
| FY10 | 150 |

| *Project Manager* | *Centers* | *Timeframe* | *Partners* |
|---|---|---|---|
| | SSC, GSFC, JPL, others | FY09 - FY10 | NOAA, EPA, ACE, DOI, others |

| | |
|---|---|
| *Earth Science Products* | Coastal/Ocean models and Geophysical Parameters. If projects cannot be identified before the FY09, then significant focus on satellite sensors incl. NPP,Jason-2; Hydros, Aquarius, NPOESS. |
| *Other Apps.* | |

*Deliverables*

| *Description* | *End Date* | *IBPD Metric #* |
|---|---|---|
| Evaluation Report | | |
| Design & Implement | | |
| Verification and Validation Report | 9/1/2009 | |
| Benchmark Report | 9/1/2010 | |
| Project Plan | 11/1/2008 | |
| Demonstration | 6/1/2010 | |

*Notes:* This acitivity will likely be supported by Solutions Network and RPC in these years or prior.

**Project:** HAB-Hypoxia / Pollution — Directed Project

This project focuses on the use of NASA Earth science research results to support activities in Harmful Algal Bloom (HAB)/hypoxia management and/or coastal pollution, including nutrients and stormwater. These issues are of significant importance to regional and national interests, especially in the Gulf of Mexico . The Coastal Management program will solicit projects related to these issues in the ROSES I, II, and other solicitations. However, if no projects are selected, the program plans to pursue a directed activity due to the signficant impact of these issues.

*Budget ($K)*

*Procurement*

| | |
|---|---|
| FY06 | 0 |
| FY07 | 0 |
| FY08 | 0 |
| FY09 | 150 |
| FY10 | 150 |

| *Project Manager* | *Centers* | *Timeframe* | *Partners* |
|---|---|---|---|
| | JPL, GSFC, SSC, others | FY09 - FY10 | NOAA, EPA, others |

*Earth Science Products*

Coastal/Ocean models and Geophysical Parameters. If projects cannot be identified before the FY09, then significant focus on satellite sensors incl. NPP,Jason-2; Hydros, Aquarius, NPOESS.

*Other Apps.*

*Deliverables*

| *Description* | *End Date* | *IBPD Metric #* |
|---|---|---|
| Evaluation Report | | |
| Design & Implement | | |
| Verification and Validation Report | 9/1/2009 | |
| Benchmark Report | 9/1/2010 | |
| Project Plan | 11/1/2008 | |
| Demonstration | 6/1/2010 | |

*Notes:* This acitivity will likely be supported by Solutions Network and RPC in these years or prior.

**Project:** Fisheries / Oil Spills — Directed Project

This project focuses on the use of NASA Earth science research results to support activities in marine fisheries and/or oil spills. These issues are of significant importance to regional and national interests. The Coastal Management program will solicit projects related to these issues in the ROSES I-IV solicitations. However, if no projects are selected, the program plans to pursue a directed activity due to the signficant impact of these issues.

*Budget ($K)*

*Procurement*

| | |
|---|---|
| FY06 | 0 |
| FY07 | 0 |
| FY08 | 0 |
| FY09 | 0 |
| FY10 | 150 |

| *Project Manager* | *Centers* | *Timeframe* | *Partners* |
|---|---|---|---|
| | GSFC, SSC, JPL, others | FY10 - FY11 | NOAA, ACE, EPA, others |

*Earth Science Products*

Coastal/Ocean models and Geophysical Parameters. If projects cannot be identified before the FY09, then significant focus on satellite sensors incl. NPP,Jason-2; Hydros, Aquarius, NPOESS.

*Other Apps.*

*Deliverables*

| *Description* | *End Date* | *IBPD Metric #* |
|---|---|---|
| Evaluation Report | | |
| Design & Implement | | |
| Verification and Validation Report | 9/1/2010 | |
| Benchmark Report | 9/1/2011 | |
| Project Plan | 11/1/2009 | |
| Demonstration | 6/1/2011 | |

*Notes:* This acitivity will likely be supported by Solutions Network and RPC in these years or prior.

**Project:** Coastal Pollution — Directed Project

This project focuses on the application of satellite data products and coastal ocean models to support decisiong making related to urban coastal pollution hazards (e.g., stormwater, treatment plant discharges, sewage and seepage, and elevated pathogens) effecting beach and near-shore water quality. This project supplements activities within an Oceans and Ice Proposal on related topics.

*Budget ($K)*

*Procurement*

| | |
|---|---|
| FY06 | 175 |
| FY07 | 175 |
| FY08 | 100 |
| FY09 | 0 |
| FY10 | 0 |

| *Project Manager* | *Centers* | *Timeframe* | *Partners* |
|---|---|---|---|
| | JPL | FY06 - FY08 | |

| *Earth Science Products* | MODIS, ROMS model, QuikSCAT. Chl a, DCOM, turbidity, color, SST, winds | *Other Apps.* |
|---|---|---|

*Deliverables*

| *Description* | *End Date* | *IBPD Metric #* |
|---|---|---|
| Evaluation Report | | |
| Design & Implement | | |
| Verification and Validation Report | 9/30/2006 | |
| Benchmark Report | 6/1/2008 | |
| Project Plan | 11/1/2005 | |
| Demonstration | 9/1/2007 | |

*Notes:*

## E. Additional Activities & Linkages

NASA and Science Mission Directorate Priorities

- Federal Enterprise Architecture (FEA) is a business and performance-based framework to support cross-agency collaboration, transformation, and government-wide improvement.
- The Global Information Grid (GIG) is the first stage of a U.S. military global, highbandwidth, Internet protocol-based communications network (a.k.a., ëthe Internet in space').
- The Joint Center for Satellite Data Assimilation (JCSDA) is a multi-agency collaboration to accelerate and improve the quantitative use of research and operational observational spacecraft observations in weather and climate prediction models. NOAA (NESDIS, NWS, OAR), NASA, Navy, Air Force, and NSF (through UCAR) collaborate in JCSDA.
- Metis is a visual modeling software tool for planning, developing, and analyzing agencies' enterprise architectures. The Applied Sciences Program is using Metis to identify possible linkages between observations, models, and decision support tools to support the IWGEO and NASA/NOAA R2O activities.
- Observing System Simulation Experiments (OSSEs) use simulated observations to assess the impacts of future observational spacecraft instruments on weather and climate prediction and provide opportunities to test new designs and methodologies for data gathering and assimilation.
- Project Columbia is a NASA-wide project to develop a new, fast supercomputer (using an integrated cluster of interconnected processor systems) to support the Agency's mission and science goals, including enhanced predictions of weather, climate, and natural hazards.

## E. IBS Request

- Rapid Prototyping Center is a proposed center at Stennis to support NASA and partners in testing and verification of Earth science results in decision support tools
- Transition from Research to Operations Network (R2O) is a network that focuses on systematically transitioning the results of research to operational uses.

### Program Response to IBS Request

To be supplied by program management.

## E. Crosscutting Request

DEVELOP is a student-based program for rapidly prototyping solutions for state and local applications and helping students develop capabilities related to applied Earth-Sun science.

Earth-Sun System Gateway is a "portal of portals" providing an access point through an Internet interface to all web-enabled NASA research results

### Program Response to Crosscutting Request

To be supplied by program management.

## VI. Budget: FY06-010

The following table lists the Coastal Mangement Program budget (procurement) for FY2006:

| Project | FY06 Procurement Allocation ($K) |
|---|---|
| Harmful Algal Blooms | $ 75 |
| RPC: Coral Reefs/ReefBase | $ 0 |
| REASoN-Coastal Decision Support | $ 370 |
| ORHAB: Supplement to ECOHAB | $ 30 |
| Program Management: Working Groups, Committees, Conferences | $ 50 |
| Model and Observation Potentials | $ 50 |
| Decisions - Augmentation: Marine Mammal Avoidance | $ 165 |
| Decisions - Augmentation: Fisheries/Oil Spills | $ 270 |
| Decisions - Augmentation: Gulf of Mexico Oil Exploration | $ 150 |
| Project Solicitations: ROSES I-IV | $ 417 |
| REASoN - Coastal Decision Support (Supplement) | $ 300 |
| Coastal Water Quality - Chesapeake Bay | $ 175 |
| Marine Fisheries & Mammals | $ 0 |
| Sediments / Stormwater Management | $ 0 |
| Sea Level Change / Estuaries | $ 0 |
| HAB-Hypoxia / Pollution | $ 0 |
| Fisheries / Oil Spills | $ 0 |
| Coastal Pollution | $ 175 |
| **Total =** | **$ 2227** |

Appendix C lists program-wide budget allocations for FY2006-10.

## VII. Program Management and Performance Measures

The Coastal Management team uses performance measures to track progress, identify issues, evaluate projects, make adjustments, and establish results of the program element. The program's goal and objectives (Section II) state what the program intends to achieve. These measures help the team monitor progress within and across specific activities to ensure the program meets its goal and objectives.2 The management team analyzes these measures retrospectively in order to made adjustments proscriptively to the program approach and objectives.

The measures are in two categories (tables below). Program Management measures are internally focused to assess the activities within the program. Performance measures are externally focused to assess if the program activities are serving their intended purpose. In general, the Coastal program uses these measures to evaluate the performance of activities conducted and sponsored by the program, especially the projects. In addition, the Earth Science Applications Program uses this information in preparing IBPD directions and PART responses.

Program Management Measures (Internally-focused):

Inputs:
1) Potential issues and DSTs identified for Coastal Management – number, type, range
2) Eligible partners to collaborate with – number, type, range
3) Potential results/products identified to serve Coastal Management – number, type, range

Outputs:
1) Assessments or evaluations of DSTs – number, range
2) Assessments of Earth science results/products to serve DSTs – number, range
3) Agreements with partners – presence
4) Reports (evaluation, validation, benchmark) – number, type

Quality and Efficiency:
1) Earth science results/products – number used per DST, ratio of utilized to potential
2) Agreements – ratio of agreements to committed partners
3) Reports – partner satisfaction, timeliness, time to develop
4) Reports – ratio of validations to potential products, ratio of benchmarks to validations

Performance & Results Measures (Externally-focused):

Outcomes:
1) Earth science products adopted in DSTs – number, type, range; use in DST over time
2) Earth science products in use – ratio of products used by partners to reports produced
3) Partner & DST performance – change in partner DST performance, number & type of public recognition of use & value of Earth science data in DST

Impacts:
1) Partner value – change in partner metrics (improvements in value of partner decisions)

In addition to the stated measures, the Coastal Management program periodically requests an assessment

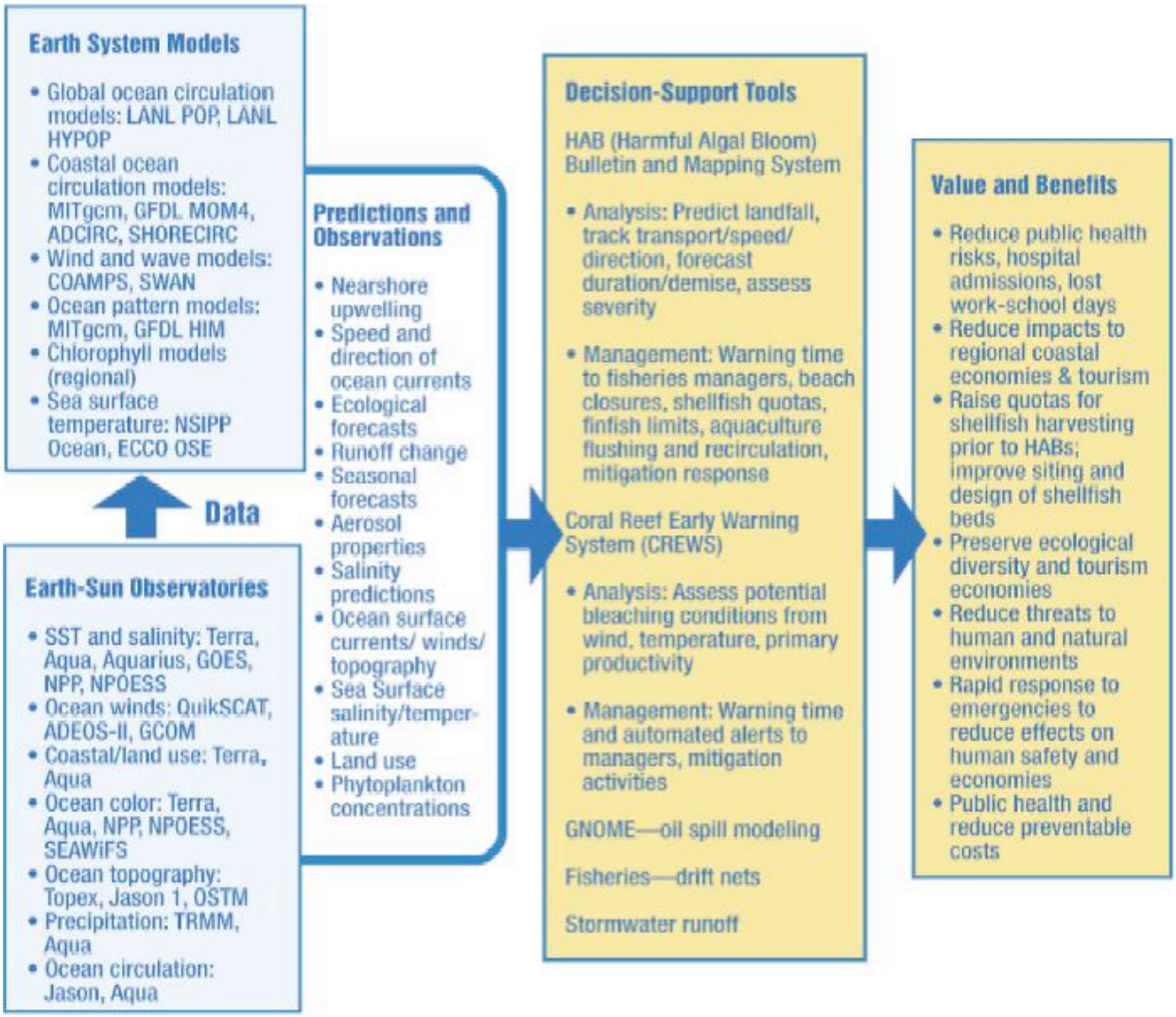
of its plans, goals, priorities, and activities through external review. The Coastal Management team uses these measures along with comparisons to programmatic benchmarks to support assessments of the Earth Science Applications Program (e.g. internal NASA reviews and OMB PART). In specific, Coastal Management uses comparisons to similar activities in the following programs (i.e., program benchmarks) to evaluate its progress and achievements:

- Environmental and Societal Impacts Group at NCAR
- NCAR Research to Applications Group
- Global Monitoring for Environment and Security (GMES) in Europe

## VIII. Appendicies

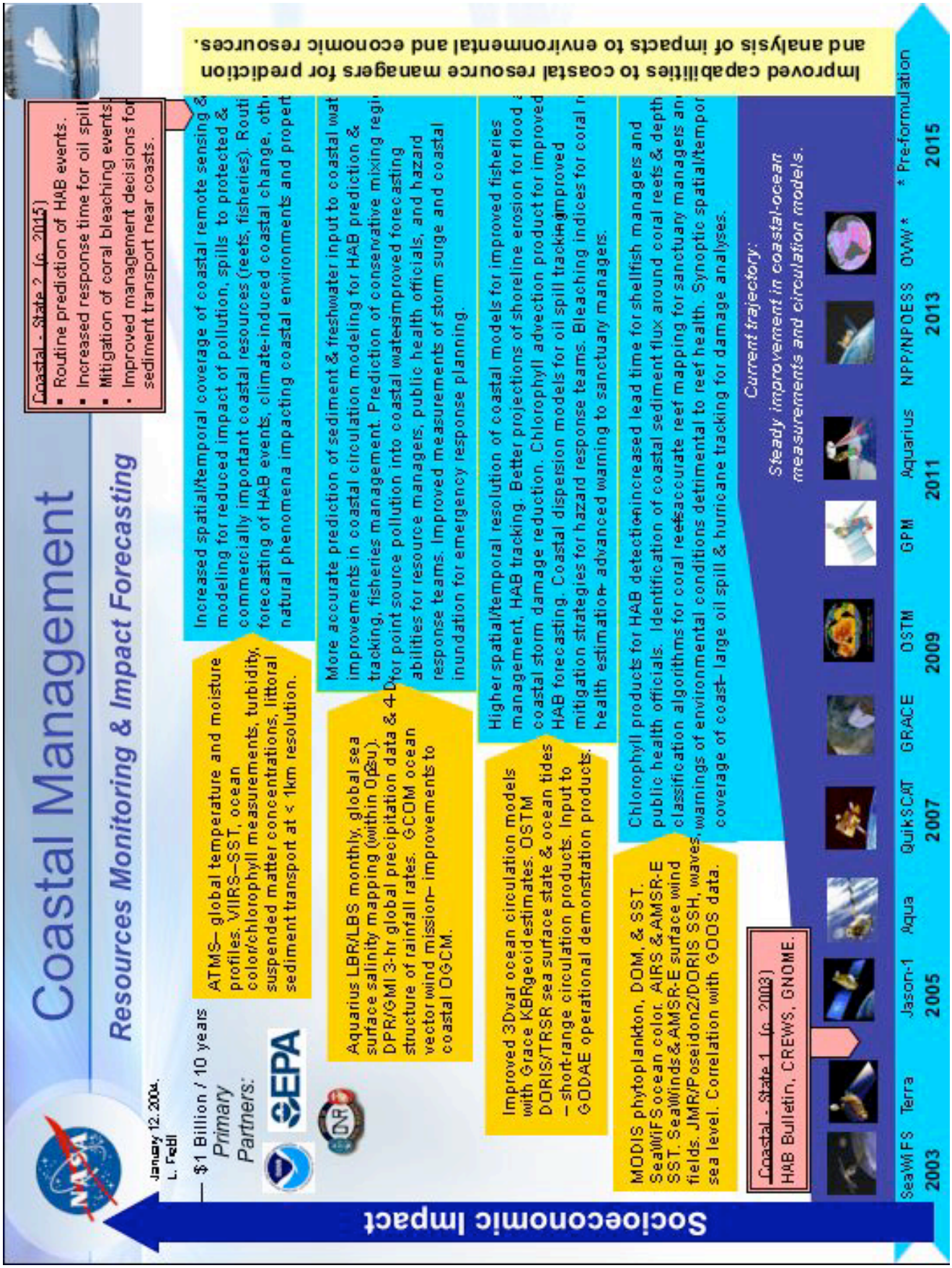
### A. Integrated System Solutions Diagram

The figure below illustrates a candidate configuration the extension of Earth science measurements, model products, and data fusion techniques to support Coastal Management partners, their decision support tools, and benefits of Earth science to society. Results from Earth-Sun system science are typically observations, data sets, climate data records, algorithms, and models utilizing the observations. For Coastal Management, observations include measures of sea surface temperature, sea surface height, wind speed and direction, ocean color, salinity, and coastal land-cover/use. Models use these and other measurements to generate predictions of coastal and ocean conditions, such as upwelling, primary productivity, and currents. The Coastal Management program works with partners on methods for their decision support tools - HAB Bulletin, CREWS/ReefBase, GNOME, others - to ingest Earth science observations and predictions and, in turn, improve the capabilities of their tools to support their decision processes.



## B. Roadmap

The figure below illustrates the evolving, progressive nature of links between the increasing capabilities of NASA-supported research, measurement systems, and technology and their extension to partners' management and policy responsibilities. The yellow bars on the left state the expected research and developments from Earth-Sun system science and technology; the blue bars to the right reflect the contributions of the research in terms of improved management capabilities. Each level shows a steady improvement in the measurements and research along with enhanced management capabilities and public value. This Coastal application roadmap builds on the roadmaps of the six ESE Science Focus Areas, particularly the Water & Energy Cycle Theme, Carbon Cycle and Ecosystems Theme, and the Climate Variability and Change Theme.


Coastal Management
Resources Monitoring & Impact Forecasting
January 12, 2004.
L. Fe8il
$1 Billion / 10 years
Primary Partners:
EPA
ATMS– global temperature and moisture profiles, VIIRS–SST, ocean color/chlorophyll measurements, turbidity, suspended matter concentrations, littoral sediment transport at < 1km resolution.
Aquarius LBR/LBS monthly, global sea surface salinity mapping (within 0.2psu). DPR/GMI 3-hr global precipitation data & 4-D structure of rainfall rates. GCOM ocean vector wind mission– improvements to coastal OGCM.
Improved 3Dvar ocean circulation models with Grace KBRgeoid estimates. OSTM DORIS/TRSR sea surface state & ocean tides – short-range circulation products. Input to GODAE operational demonstration products.
MODIS phytoplankton, DOM, & SST. SeaWiFS ocean color, AIRS &AMSR-E SST. SeaWinds&AMSR-E surface wind fields. JMR/Poseidon2/DORIS SSH, waves, sea level. Correlation with GOOS data.
Coastal - State 1 (c. 2003)
HAB Bulletin, CREWS, GNOME.
Increased spatial/temporal coverage of coastal remote sensing & modeling for reduced impact of pollution, spills to protected & commercially important coastal resources (reefs, fisheries). Routi forecasting of HAB events, climate-induced coastal change, oth natural phenomena impacting coastal environments and propert
More accurate prediction of sediment & freshwater input to coastal wat improvements in coastal circulation modeling for HAB prediction & tracking, fisheries management. Prediction of conservative mixing regi for point source pollution into coastal waters improved forecasting abilities for resource managers, public health officials, and hazard response teams. Improved measurements of storm surge and coastal inundation for emergency response planning.
Higher spatial/temporal resolution of coastal models for improved fisheries management, HAB tracking. Better projections of shoreline erosion for flood coastal storm damage reduction. Chlorophyll advection product for improved HAB forecasting. Coastal dispersion models for oil spill tracking improved mitigation strategies for hazard response teams. Bleaching indices for coral health estimation– advanced warning to sanctuary managers.
Chlorophyll products for HAB detection– increased lead time for shellfish managers and public health officials. Identification of coastal sediment flux around coral reefs & depth classification algorithms for coral reefs– accurate reef mapping for sanctuary managers an warnings of environmental conditions detrimental to reef health. Synoptic spatial/tempor coverage of coast– large oil spill & hurricane tracking for damage analyses.
Current trajectory:
Steady improvement in coastal-ocean measurements and circulation models.
Coastal - State 2 (c. 2015)
Routine prediction of HAB events.
Increased response time for oil spill
Mitigation of coral bleaching events
Improved management decisions for sediment transport near coasts.
Improved capabilities to coastal resource managers for prediction and analysis of impacts to environmental and economic resources.
Socioeconomic Impact
SeaWiFS 2003
Terra
Aqua
Jason-1 2005
QuikSCAT
GRACE 2007
OSTM 2009
GPM
Aquarius 2011
NPP/NPOESS OVW* 2013
* Pre-formulation 2015

## C. Applied Sciences Program Budgets FY2006-10

The following figures represent the FY06 budgets for the respective Program Elements; they do not represent the entire Applied Sciences Program budget. There is an additional $8.95million in Congressionally-directed activities and $5million for the Mississippi Research Consortium that these figures do not incorporate.

| Program Element | FY06 Procurement Allocation |
|---|---|
| **National Applications** | |
| Agricultural Efficiency | $ 1,955,803 |
| Air Quality | $ 3,116,464 |
| Aviation | $ 3,048,878 |
| Carbon Management | $ 1,544,831 |
| Coastal Management | $ 1,416,233 |
| Disaster Management | $ 2,743,760 |
| Ecological Forecasting | $ 3,240,170 |
| Energy Management | $ 1,875,253 |
| Homeland Security | $ 1,987,054 |
| Invasive Species | $ 2,241,940 |
| Public Health | $ 3,356,124 |
| Water Management | $ 1,714,341 |
| | |
| **Crosscutting Solutions** | |
| DEVELOP | $ 1,498,000 |
| Geospatial Interoperability | $ 2,400,000 |
| Solutions Networks | $ 2,822,000 |
| Integrated Benchmarking System | $ 4,500,000 |

The following figures show the five-year run-out for the entire Applied Sciences Program. The figures are based on the FY07 President's budget submitted to Congress. The lower line shows the target budget including agency corporate and institutional adjustments.

| | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|
| **Present Budget Summited to Congress** | 53,254,855 | 51,049,000 | 50,287,000 | 48,588,000 | 48,662,000 |
| **Target After Adjustments** | 47,321,663 | 39,101,000 | 33,922,000 | 34,801,000 | 34,803,000 |

## D. Related NASA and Partner Solicitations and Grants

Appendix D lists NASA Earth-Sun system science research projects, Earth science fellowships, GLOBE activities, and Earth science New Investigators related to Coastal Management activities.

***Fellowships***

**Earth Science Education**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| UC Santa Barbara | Clarissa Anderson | 2004 award (05-07) A Model for Remotely Detecting the Dynamics and Toxicity of Pseudo-nitzschia Blooms in the Santa Barbara Channel | 2005-2007 |

***Fellowships***

**Earth Science Education**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| Woods Hole Oceanographic Institution | Melanie Fewings | Physical Processes in Continental Shelf Ecosystems: The Influence of Density Stratification on Phytoplankton Dynamics | 2005-2007 |

***Fellowships***

**Earth Science Education**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| University of Washington | Lauren Juranek | Improving Satellite-Based Primary Productivity Estimates Using a New In Situ Oxygen Isotope Technique | 2005-2007 |

***Fellowships***

**Earth Science Education**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| Stanford University | Sudeshna Pabi | Determine Taxon Specific POC Using Remote Sensing | 2005-2007 |

***Fellowships***

**Earth Science Education**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| UC Davis | Todd Steissberg | Using Remote Sensing to Quantify Particulate and Solute Fluxes in Aquatic Systems | 2005-2007 |

***Fellowships***

**Earth Science Education**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| Texas A&M | Caihong Wen | A Study of Atmospheric Response to Tropical Atlantic Mesoscale SST Variability and the Associated Air-Sea Feedbacks Using Satellite Observations and Numerical Models | 2005-2007 |

***Fellowships***

**Earth Science Education**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| University of South Florida | Robyn Conmy | Seasonal Distribution and Cycling of CDOM on River- Dominated Shelves: Implications for Remote Sensing Imaging and Source Differentiation. | 2004-2006 |

***Fellowships***

**Earth Science Education**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| University of Maryland Center for Environmental Sciences | William Miller | Influence of Synoptic-Scale Climate Variability on Phytoplankton Biomass and Primary Productivity in Chesapeake Bay | 2004-2006 |

***Fellowships***

**Earth Science Education**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| University of Florida | Tracy Van Holt | Twenty Years of Land-cover and Land-use Change Effects on Nearshore Marine Resources in Southern Chile | 2004-2006 |

***Fellowships***

**Earth Science Education**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| Stanford University | Tasha Reddy | Model Resolution Effects on Oceanic Primary Production Estimates and Validation using Remotely Sensed Data: A Case Study for the Ross Sea, Antarctica | 2004-2006 |

***Fellowships***

**Earth Science Education**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| University of Maryland College Park | Megan Weiner | Radar Monitoring of Hydrologic Variability in Maryland's Forested Coastal Plain Wetlands | 2004-2006 |

### Fellowships

**Earth Science Education**

| Institution | PI | Title/Subject | Timeframe |
|---|---|---|---|
| University of Miami | John Brown | A Satellite Remote Sensing Case Study of the Hydrological Cycle and Oceanic Response in the Bay of Bengal. | 2004-2006 |

### Fellowships

**Earth Science Education**

| Institution | PI | Title/Subject | Timeframe |
|---|---|---|---|
| UCSB | Tihomir Kostadinov, | Global Regionalization of a Semi-analytical Ocean Color Algorithm for Case II Environments. | 2004-2006 |

### GLOBE

**Earth Science Education**

| Institution | PI | Title/Subject | Timeframe |
|---|---|---|---|
| Arizona State | Conklin, Bales, Manglin | Hydrology (Manglin: marine biology) | NULL |

### New Investigators

**Earth Science Education**

| Institution | PI | Title/Subject | Timeframe |
|---|---|---|---|
| University of Hawaii | Eric Hochberg | Empirical Radiative Transfer Corrections for Deterministic Coral Reef Remote Sensing | 2004-2006 |

***New Investigators***

**Earth Science Education**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| GSFC | Antonio Mannino | Dynamics of Coastal Ocean Dissolved Organic Matter | 2004-2006 |

***New Investigators***

**Earth Science Education**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| University of New Hampshire | John Morrison | Real Time Observations and Interpretation of Solar Radiation in Coastal Waters of New England: Phytoplankton Fluorescence, Ocean Color, and Heating | 2004-2006 |

***New Investigators***

**Earth Science Education**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| University of Maryland College Park | Baris Uz | Remote Sensing Study of Physical-Biological Interactions in the Ocean; the Role of Baroclinic Disturbances | 2004-2006 |

***Research Projects***

**Interdisciplinary NRA**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| Roffer Ocean Fishing Service | Mitch Roffer | Study of Ocean Environmental Parameters to Forecast the Effects of Climate Variability on Pelagic Fish Resources | 2004-2006 |

***Research Projects***

**Interdisciplinary NRA**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| University of South Florida | Serge Andrefouet | Environmental Assessments of Coral Reef Ecosystems | 2004-2006 |

***Research Projects***

**Interdisciplinary NRA**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| University of South Carolina | Anthony Boccanfuso | Climate Change and Intertidal Biogeography | 2004-2006 |

***Research Projects***

**Interdisciplinary NRA**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| Ocean Imaging | L. Deysher | Monitoring of Global Change in Temperate Reef Communities Using Satellite Remote Sensing Technologies | 2004-2006 |

***Research Projects***

**REASoN**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| GSFC | Gregg | Development and Maintenance of An Ocean Color Time Series | 2003-2006 |

### Research Projects

**REASoN**

| Institution | PI | Title/Subject | Timeframe |
|---|---|---|---|
| GSFC | Atlas | A Cross-Calibrated, Multi-Platform Ocean Surface Wind Velocity Product for Meteorological and Oceanographic Applications | 2003-2006 |

### Research Projects

**REASoN**

| Institution | PI | Title/Subject | Timeframe |
|---|---|---|---|
| JPL | Zlotnicki | Grace Products for Hydrology and Oceanography | 2003-2006 |

### Research Projects

**REASoN**

| Institution | PI | Title/Subject | Timeframe |
|---|---|---|---|
| URI | Cornillion | A Thematic Data Portal to Satellite-Derived Ocean Surface Properties | 2003-2006 |

### Research Projects

**NPOESS Preparatory Project**

| Institution | PI | Title/Subject | Timeframe |
|---|---|---|---|
| GSFC | McClain | End-to-End Assessment of NPP/VIIRS Ocean Color Data | 2004-2006 |

***Research Projects***

**NPOESS Preparatory Project**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| University of Miami | Minnett | Climate Data Records of Sea Surface Temperature from VIIRS | 2004-2006 |

***Research Projects***

**NPOESS Preparatory Project**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| Stevens | Stamnes | Evaluation of NPOESS Retrieval Algorithms: Atmospheric Correction, Ocean Color Products, and Snow / ICE Products | 2004-2005 |

***Research Projects***

**NPOESS Preparatory Project**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| UMBC | Wang | Assessment and Evaluation of the Atmospheric Correction Algorithm for the NPP VIIRS Ocean Color EDRs | 2004-2006 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| University of Maryland College Park | Ballabrera-Poy | Physical Controls of the Optical Properties of Upper Ocean Water, and Its Application to Climate Modeling | 2004-2006 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| University of New Hampshire | Campbell | SeaWiFS-Analog Chlorophyll Algorithm: Insuring Continuity of the Climate Data Record for Chlorophyll | 2004-2006 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| University of South Florida | Carder | Quantifying HAB Concentrations and Chlorophyll A in Coastal Waters | 2004-2006 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| University of South Florida | Coda | Multi-Sensor Coastal Ocean and Atmosphere Time-Series | 2004-2006 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| University of Rhode Island | Dierssen | Benthic Ecology from Space: Algorithms for Remote Sensing of Seagrass Primary Production from the MODIS Ocean Color Sensor | 2004-2006 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| University of Miami | Evans | Improved MODIS Ocean Color and Sea Surface Temperature Calibration to Enable Science, Climate Studies, and Algorithm Development | 2004-2006 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| UCSD | Gille | Dynamics of Sea Surface Temperature Variability in the Southern Ocean | 2004-2006 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| GSFC | Gregg | Development of an Ocean Biogeochemical EOS Assimilation Model (OBEAM) | 2004-2006 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| GSFC | Hooker | Refinement and Maintenance of EOS Ocean Color Algorithms | 2004-2006 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| Columbia | Kaplan | Small-Scale Variability in Sea Surface Temperatures and Climate Analyses Error | 2004-2006 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| UCSB | Maritorena | Chlorophyll A Algorithms for MODIS | 2004-2006 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| Columbia | Marra | Primary Productivity from Ocean Color Based on Photosynthetic Quantum Efficiency and Phytoplankton Absorption | 2004-2006 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| GSFC | McClain | MODIS Ocean Color Calibration and Validation Support | 2004-2006 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| University of Miami | Minnett | Sea-Surface Temperature from MODIS | 2004-2006 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| University of South Florida | Muller-Karger | EAGLE-EYE: Ecological Assessment of Generalized Littoral Environments | 2004-2006 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| UCSB | Nelson | Ocean Optical Properties, MODIS Ocean Products, and Atmospheric Dust: The Bermuda Bio-Optics Project | 2004-2006 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| Arizona State | Neuer | Analysis of Nutrient Budgets and Carbon Export in the Eastern and Western Subtropical North Atlantic Ocean | 2004-2006 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| MSFC | Robertson | Fresh Water Fluxes and Boundary Layer Thermodynamics Over the Global Oceans from Aqua and Other EOS Satellite Measurements | 2004-2006 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| UCSB | Siegel | MODIS Ocean Color Imagery to a Case II Ocean: Case Study of Plumes and Blooms in the Santa Barbara Channel | 2004-2006 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| Stevens | Stamnes | Simultaneous Retrieval of Aerosol Optical Properties and Marine Constituents in Coastal Waters | 2004-2006 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| NOAA | Stumpf | Variability of Chlorophyll and Light Availability in Estuarine and Coastal Case 2 Waters | 2004-2006 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| UMBC | Wang | MODIS Atmospheric Correction Algorithm for the Ocean Color Products | 2004-2006 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| Remote Sensing Systems | Wentz | Refinement and Validation of the AMSR-E Ocean Algorithm | 2004-2006 |

***Research Projects***

**Carbon Cycle Science**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| Plymouth Marine Laboratory | Jim Aiken | Observation of Air-Sea Interactions & Fluxes of Carbon | 2005-2008 |

***Research Projects***

**Carbon Cycle Science**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| GSFC | Michael Behrenfeld | Ocean Productivity from Satellite-Derived Phytoplankton Physiology and Carbon Biomass (NASA) | 2005-2008 |

***Research Projects***

**Carbon Cycle Science**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| Woods Hole Oceanographic Institution | Scott Doney | Hindcasting Seasonal to Interannual Variability in Air-sea CO2 Flux for the North American Carbon Project (NASA) | 2005-2008 |

***Research Projects***

**Carbon Cycle Science**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| Oregon State University | Burke Hales | Development of Algorithms for Prediction of Coastal CO2 Air- Sea Fluxes Using Remote Sensing | 2005-2008 |

***Research Projects***

**Carbon Cycle Science**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| University of Southern Mississippi | Steven Lohrenz | Satellite Assessments of Regional pCO2 Distributions and Air- Sea Fluxes of Carbon Dioxide in a River-Dominated Margin (NASA) | 2005-2008 |

***Research Projects***

**Carbon Cycle Science**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| Bigelow Laboratory for Ocean Science | Patricia Matrai | Organic Matter Metabolism in a Coastal Ocean Ecosystem (NASA) | 2005-2008 |

***Research Projects***

**Carbon Cycle Science**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| Woods Hole Oceanographic Institution | Dennis McGillicuddy | A Regional Eddy-Resolving Carbon Cycle Model Surrounding the Bermuda Atlantic Time-Series Study (BATS) Site: Analysis of Remotely Sensed and In Situ Observations (NASA) | 2005-2008 |

***Research Projects***

**Carbon Cycle Science**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| University of New Hampshire | Scott Ollinger | Scaling and Evaluation of Ecosystem Carbon Uptake Through Integration of Multi-Scale Remote Sensing with AmeriFLUX and NACP Field Observations for the Studies of Earth, Oceans and Space (NASA) | 2005-2008 |

***Research Projects***

**Carbon Cycle Science**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| Lamont Doherty Earth Observatory | Ajit Subramaniam | Mapping Dissolved Organic Carbon in Eastern U.S. Coastal Waters Using Ocean Color Satellite Data (NASA) | 2005-2008 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| Moss Landing | Breaker | Response of the Upper Ocean to Varying Meteorological Conditions Using Ocean Models and Satellite Imagery | 2004-2006 |

***Research Projects***

**EOS Continuation: Aqua-Terra-ACRIM**

| *Institution* | *PI* | *Title/Subject* | *Timeframe* |
|---|---|---|---|
| San Diego | Mueller | HPLC Phytoplankton Pigments Measurements | 2004-2006 |

## E. Acronyms and Websites

### ACRONYMS:

| | |
|---|---|
| ACT | Applied Coherent Technologies |
| ADCRIC | Advanced Circulation Model |
| AGU | American Geophysical Union |
| AMS | American Meteorological Society |
| AMSR | Advanced Microwave Scanning Radiometer |
| ARC | Ames Research Center |
| ASLO | American Society of Limnology and Oceanography |
| AVHRR | Advanced Very High Resolution Radiometer |
| BATS | Bermuda Atlantic Time-Series Study |
| CCRI | Climate Change Research Initiative |
| CCSP | Climate Change Science Program |
| CCTP | Climate Change Technology Program |
| CDOM | Colored Dissolved Organic Matter |
| CLEAR | Center for Land Use and Education Research |
| CO | Carbon Monoxide |
| CO2 | Carbon Dioxide |
| CREWS | Coral Reef Early Warning System |
| CSC | Coastal Service Center |
| DAAC | Distributed Active Archive Center (Data Active Archive Center) |
| DEVELOP | No longer an acronym |
| DSS | Decision Support Systems |
| EAGLE-EYE | Ecological Assessment of Generalized Littoral Environments |
| ECOHAB | Ecology and Oceanography of Harmful Algal Blooms |
| EDR | Environmental Data Records |
| ELCIRC | Eulerian-Lagrangian Circulation |
| EOS | Earth Observing Systems |
| EPA | US Environmental Protection Agency |
| FEA | Federal Enterprise Architecture |
| FWS | Fish and Wildlife Service |
| FY | Fiscal Year |
| GES DAAC | Goddard Earth Science Distributed Active Archive Center |
| GHRC | Global Hydrology Resource Center |
| GIG | Global Information Grid |
| GLOBE | Global Learning and Observations to Benefit the Environment |
| GMES | Global Monitoring for Environment and Security |
| GNOME | General NOAA Oil Modeling Environment (Coastal Mgmt. DSS) |
| GOES | Geostationary Operational Environmental Satellite |
| GPM | Global Precipitation Measurement |
| GPMO | Gulf of Mexico Program Office |
| GSFC | Goddard Space Flight Center |
| HAB | Harmful Algal Bloom |

| | |
|---|---|
| IBPD | Integrated Budget and Performance Document |
| IGOS | Integrated Global Observations strategy |
| IWGEO | Interagency Working Group on Earth Observations |
| Jason | Spacecraft with instruments to study ocean surface topography |
| JCSDA | Joint Center for Satellite Data Assimilation |
| JPL | Jet Propulsion Laboratory |
| LaRC | Langley Research Center |
| LP DAAC | Land Processes Distributed Active Archive Center |
| MMS | Mineral Management Service (Malaria Monitoring and Surveillance) |
| MODIS | Moderate Resolution Imaging Spectroradiometer |
| NASA HQ | NASA Headquarters |
| NASA | National Aeronautics and Space Administration |
| NCAR | National Center for Atmospheric Research |
| NCDDC | National Coastal Data & Distribution Center |
| NCOM | Navy Coastal Ocean Model |
| NESDIS | National Environmental Satellite Data Information Service |
| NIP | New Investigators Program |
| NMFS | National Marine Fishery Service |
| NOAA | National Oceanic and Atmospheric Administration |
| NOS | National Ocean Service |
| NPOESS | National Polar-Orbiting Operational Environmental Satellite System |
| NPP | NPOESS Preparatory Project/Net Primary Productivity |
| NRL | Navy Research Laboratory |
| NSF | National Science Foundation |
| NWS | National Weather Service |
| OBEAM | Ocean Biogeochemical EOS Assimilation Model |
| OEA | Office of Environmental Information |
| OIA | Office of International Activities |
| OMB | Office of Management and Budget |
| ORD | Office of Research and Development |
| ORHAB | Olympic Region Harmful Algal Blooms |
| OSSE | Observing System Simulation Experiment |
| OSTM | Ocean Surface Topography Mission |
| OSTP | Office of Science and Technology Policy |
| OW | Office of Water |
| PART | Program Assessment Rating Tool |
| PO DAAC | Physical Oceanography Distributed Active Archive Center |
| POC | Point of Contact |
| POES | Polar Orbiting Environmental Satellites |
| POM | Princeton Ocean Model |
| QuikSCAT | Quick Scatterometer |
| QUODDY | Hydro Dynamic Model Developed by the North Carolina Coastal Observing System |
| R2O | Research to Operations Network |
| RACNE | Regional Applications Center for the Northeast |
| REASoN | Research, Education, and Applications Solutions Network |

| | |
|---|---|
| SEA | State Enterprise Architecture |
| SeaWiFS | Sea-viewing Wide-Field-of-View Sensor |
| SHORCIRC | SHORCIRC Near Shore Circulation Model |
| SSC | Stennis Space Center |
| SST | Sea surface temperature |
| SWAN | Solar Winds Anisotropies (Instrument from Finland) |
| TBD | To Be Determined |
| TOPEX/POSEIDON | Satellite from JPL with Five Instruments |
| TOS | The Oceanography Society |
| TRMM | Tropical Rainfall Measurement Mission |
| UCAR | University Corporation for Atmospheric Research |
| UCSB | University of California Santa Barbara |
| UCSD | University of California San Diego |
| UK | United Kingdom |
| U Md – CP | University of Maryland at College Park |
| UMBC | University of Maryland Baltimore County |
| UNH | University of New Hampshire |
| URI | University of Rhode Island |
| USACE | United States Army Corps of Engineers |
| USCG | United States Coast Guard |
| USGS | United States Geological Survey |
| V&V | Verification and Validation |
| VIIRS | Visible/Infrared Imager/Radiometer Suite |
| WFF | Wallops Flight Facility |

**WEBSITES:**

AIWG: http://aiwg.gsfc.nasa.gov
Applied Sciences Program: http://science.hq.nasa.gov/earth-sun/applications
DEVELOP: http://develop.larc.nasa.gov
Earth-Sun System Gateway (ESG): http://esg.gsfc.nasa.gov/
Earth-Sun Science System Components: http://www.asd.ssc.nasa.gov/m2m
NASA FY2005 Budget: http://www.ifmp.nasa.gov/codeb/budget2005
Research and Analysis Program: http://science.hq.nasa.gov/earth-sun/science/
Science Mission Directorate: http://science.hq.nasa.gov
Science Strategies: http://science.hq/nasa.gov/strategy/